

DETAILED ACTION

1. The instant application having application No 10/599103 filed on 09/19/2006 is presented for examination by the examiner.

Oath/Declaration

2. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in 37 C.F.R. 1.63.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 05/02/2007. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1-4, 6-12, 14-17, and 19-25** are rejected under 35 U.S.C 102 (e) as being anticipated by Walton ET al (US 6493331, Dec. 10, 2002) (Hereinafter Walton et al).

Regarding **Claim 1**, Walton discloses *method for scheduling data for transmission during a transmit time interval in a multi-carrier communication environment* (Column 36, line 7-10, the cell receives the user request, schedules the data transmission, and sends the scheduling information to the user, such scheduling information include the time interval in which the data transmission can occur) *comprising: determining channel condition indicia for a plurality of users* (Column 54, line 54-56, resource allocation processor 1430 further directs the processing of these transmissions based on the determined link quality); in an iterative manner (Column 19, line 50-55, the iterative process can continue until the effective link margins for the cells no longer change appreciably from iteration to iteration or until some defined conditions are satisfied); *pre-assigning select OFDM tones for each remaining user of the plurality of users that has not been permanently assigned tones for the transmit time interval* (Column 53, line 5-21, data processor 1520 can assign the available resources such that the system goals of high performance and high efficiency are achieved. The data transmissions are thus "scheduled" to achieve the system goals. After assigning each channel data stream to its respective time slot(s), sub-channel(s), and antenna(s), the data in the channel data stream is modulated using multi-carrier

modulation, orthogonal frequency division multiplexing (OFDM) modulation the data in each channel data stream is grouped to blocks, with each block having a particular number of data bits. The data bits in each block are then assigned to one or more channels associated with data stream); *selecting a remaining user having least favorable channel conditions as an active user* (see Fig 11, , Block, 1114, select "Best" channel from list of unassigned channels); *and permanently assigning to the active user the select OFDM tones pre-assigned to the active user, wherein once the select OFDM tones are permanently assigned to the active user, the active user is no longer a remaining user* (see Fig 10, , column 43, line 15-22, In a specific channel assignment scheme that is simple to implement, the best possible channel is assigned to successively lower priority users, starting with the highest priority user, the higher priority users are less tolerant to interference and are assigned better channels, thus, user 1 (the highest priority user) is assigned channel 2 corresponding to its highest metric of 14.55. Channel 2 is then removed from the list of available channels in the cell).

Regarding **Claim 2**, Walton discloses *the select tones permanently assigned to active users are no longer available for pre-assignment to the remaining users* (column 53, line 36-40, Each element of the modulation symbol vector V is associated with a specific sub-channel having a unique frequency or tone on which the modulation symbols is conveyed, the collection of these L modulated symbols are all orthogonal to

one another, they are no longer available for remaining users).

Regarding **Claim 3**, Walton discloses *initiating scheduling for the transmit time interval for the plurality of users using the select tones permanently assigned to each of the plurality of users* (column 36, line 5-15, scheduling information include the time interval in which the data transmission can occur to employ the assigned channel of users).

Regarding **Claim 4**, Walton discloses *for each remaining user, pre-assigning the select tones comprises: sorting tones in light of channel condition information; and selecting ones of the tones having most favorable channel conditions as the select tones* (column 13, line 23-32, In accordance with the cells can impose "blocking" (i.e., no transmission) on themselves on certain channels if the channel conditions deteriorate to an unacceptable level, each cell can measure the performance of the channels and self-impose blocking on poor performing channels until there is reasonable certainty that the channel conditions has improved and that reliable communications can be achieved).

Regarding **Claim 6**, Walton discloses *determining a number of the select tones for transmitting original data and a number of the select tones for transmitting redundant data*(column 44, line 59-70, reuse utilization is defined as the ratio of the number of active cells to total number of cells. In the system simulation, a large number of traffic

distribution realizations (or simply, realizations) are evaluated); *and increasing the number of the select tones for transmitting redundant data for remaining users with poor channel conditions*(column 8, column 61-62, Table 2, it can be observed that the average channel efficiency increases as reuse increases).

Regarding **Claim 7**, Walton discloses *selecting a remaining user further comprises: determining a scheduling factor for each remaining user based on the channel condition indicia; and selecting the remaining user having the least favorable scheduling factor as the active user* (column 4, lines 32-39, scheduling data transmissions is updated, and the data transmissions to the users are prioritized and assigned to available channels based on their priorities).

Regarding **Claim 8**, Walton discloses *the data scheduled for transmission is real-time data* (page 6, paragraph (0068), See Fig 5, line 7-11, However, the scheduler will be allocating capacity based on real-time data transmission requests, which are a function of the actual amount of data and the present state of the time-varying communications channel).

Regarding **Claim 9**, Walton discloses *the data scheduled for transmission is voice information* (column 36, lines 36-56, the transmission pattern is then selected and data transmissions are scheduled to ensure conformance with the requirements of the users. The invention can be advantageously employed in numerous applications.

For example, the invention can be used in a communications system that provides broadband packet data services, which can be used to support the Internet, E-commerce, distribution of content, broadcast of media, and many other applications. The invention can be used to provide voice, video, data, text, and so on, over a wireless communications system to users in home, work, and mobile environments).

Regarding **Claim 10**, Walton discloses *groups of the tones with a time and frequency continuum associated with the transmit time interval are associated with channels* (column 53, lines 16-21, In one implementation of OFDM modulation, the data in each channel data stream is grouped to blocks, with each block having a particular number of data bits. The data bits in each block are then assigned to one or more sub-channels associated with that channel data stream), *and the tones are pre-assigned to the remaining users and permanently assigned to the active users according to corresponding channels*(see Fig 10, , column 43, line 15-22, In a specific channel assignment scheme that is simple to implement, the best possible channel is assigned to successively lower priority users, starting with the highest priority user, the higher priority users are less tolerant to interference and are assigned better channels, thus, user 1 (the highest priority user) is assigned channel 2 corresponding to its highest metric of 14.55. Channel 2 is then removed from the list of available channels in the cell).

Regarding **Claim 11**, Walton discloses *groups of tones are associated, and further comprising effecting signaling for scheduling based on the groups of tones to reduce signaling overhead* (column 36, line 33-38, the C/I of the users are determined and users are classified into groups based on their tolerance for up to q concurrent transmissions. The transmission pattern is then selected and data transmissions are scheduled to ensure conformance with the requirements of the Users).

Regarding **Claim 12**, Walton discloses *the number of tones pre-assigned to remaining users increases with each re-transmission attempt* (column 31, line 49-56, In one channel upgrade scheme, users are successively reassigned to better available channels starting from the highest priority user, if these channels meet the requirements of the users and can provide larger link margins. Successively lower priority users (i.e., from highest to lowest) can then be assigned to any remaining channels).

Regarding **Claim 14**, Walton discloses *a system for scheduling data for transmission during a transmit time interval in a multi-carrier communication environment* (Column 36, line 7-10, The cell receives the user request, schedules the data transmission, and sends the scheduling information to the user, Such scheduling information include the time interval in which the data transmission can occur); *a communication interface; a network interface; and a control system associated with the communication interface and the network interface, the control system adapted to: determine channel condition indicia for a plurality of users*(Column 54, line 54-56,

Resource allocation processor 1430 further directs the processing of these transmissions based on the determined link quality); *and in an iterative manner* (Column 19, line 50-55, The iterative process can continue until the effective link margins for the cells no longer change appreciably from iteration to iteration or until some defined conditions are satisfied); *pre-assigning select tones for each remaining user of the plurality of users, which have not been permanently assigned tones for the transmit time interval*(Column 53, line 5-21, data processor 1520 can assign the available resources such that the system goals of high performance and high efficiency are achieved. The data transmissions are thus "scheduled" to achieve the system goals. After assigning each channel data stream to its respective time slot(s), sub-channel(s), and antenna(s), the data in the channel data stream is modulated using multi-carrier modulation, orthogonal frequency division multiplexing (OFDM) modulation the data in each channel data stream is grouped to blocks, with each block having a particular number of data bits. The data bits in each block are then assigned to one or more channels associated with data stream); *selecting a remaining user having least favorable channel conditions as an active user*(see Fig 11, , Block, 1114, select "Best" channel from list of unassigned channels); *and permanently assigning to the active user the select tones pre-assigned to the active user wherein once the select tones are permanently assigned to the active user, the active user is no longer a remaining user* (see Fig 10, , column 43, line 15-22, In a specific channel assignment scheme that is simple to implement, the best possible channel is assigned to successively lower priority users, starting with the highest priority user, the higher priority users are less tolerant to

interference and are assigned better channels, thus, user 1 (the highest priority user) is assigned channel 2 corresponding to its highest metric of 14.55. Channel 2 is then removed from the list of available channels in the cell).

Regarding **Claim 15**, Walton discloses *the select tones permanently assigned to active users are no longer available for pre-assignment to the remaining users* (column 53, line 36-40, Each element of the modulation symbol vector V is associated with a specific sub-channel having a unique frequency or tone on which the modulation symbols is conveyed, the collection of these L modulated symbols are all orthogonal to one another, they are no longer available for remaining users).

Regarding **Claim 16**, Walton discloses *the control system is further adapted to initiate scheduling for the transmit time interval for the plurality of users using the select tones permanently assigned to each of the plurality of users* (column 36, line 5-15, scheduling information include the time interval in which the data transmission can occur to employ the assigned channel of users).

Regarding **Claim 17**, Walton discloses *for each remaining user, to pre-assign the select tones, the control system is further adapted to: sort tones in light of channel condition information; and select ones of the tones having most favorable channel conditions as the select tones*(column 13, line 23-32, In accordance with the cells can impose "blocking" (i.e., no transmission) on themselves on certain channels if the

channel conditions deteriorate to an unacceptable level, each cell can measure the performance of the channels and self-impose blocking on poor performing channels until there is reasonable certainty that the channel conditions has improved and that reliable communications can be achieved).

Regarding **Claim 19**, Walton discloses *the control system is further adapted to determine a number of the select tones for transmitting original data and a number of the select tones for transmitting redundant data* (column 44, line 59-70, reuse utilization is defined as the ratio of the number of active cells to total number of cells. In the system simulation, a large number of traffic distribution realizations (or simply, realizations) are evaluated); *and increase the number of the select tones for transmitting redundant data for remaining users with poor channel conditions*(column 8, column 61-62, Table 2, it can be observed that the average channel efficiency increases as reuse increases).

Regarding **Claim 20**, Walton discloses *the to select a remaining user, the control system is further adapted to: determine a scheduling factor for each remaining user based on the channel condition indicia; and select the remaining user having the least favorable scheduling factor as the active user*(column 4, lines 32-39, scheduling data transmissions is updated, and the data transmissions to the users are prioritized and assigned to available channels based on their priorities).

Regarding **Claim 21**, Walton discloses *the data scheduled for transmission is real-time data* (page 6, paragraph (0068), See Fig 5, line 7-11, However, the scheduler will be allocating capacity based on real-time data transmission requests, which are a function of the actual amount of data and the present state of the time-varying communications channel).

Regarding **Claim 22**, Walton discloses *the data scheduled for transmission is voice information* (column 36, lines 36-56, the transmission pattern is then selected and data transmissions are scheduled to ensure conformance with the requirements of the users. The invention can be advantageously employed in numerous applications. For example, the invention can be used in a communications system that provides broadband packet data services, which can be used to support the Internet, E-commerce, distribution of content, broadcast of media, and many other applications. The invention can be used to provide voice, video, data, text, and so on, over a wireless communications system to users in home, work, and mobile environments).

Regarding **Claim 23**, Walton discloses *the groups of the tones with a time and frequency continuum associated with the transmit time interval are associated with channels*(column 53, lines 16-21, In one implementation of OFDM modulation, the data in each channel data stream is grouped to blocks, with each block having a particular number of data bits. The data bits in each block are then assigned to one or more sub-channels associated with that channel data stream), and the tones are pre-

assigned to the remaining users and permanently assigned to the active users according to corresponding channels(see Fig 10, , column 43, line 15-22, In a specific channel assignment scheme that is simple to implement, the best possible channel is assigned to successively lower priority users, starting with the highest priority user, the higher priority users are less tolerant to interference and are assigned better channels, thus, user 1 (the highest priority user) is assigned channel 2 corresponding to its highest metric of 14.55. Channel 2 is then removed from the list of available channels in the cell).

Regarding **Claim 24**, Walton discloses *the groups of tones are associated, and further comprising effecting signaling for scheduling based on the groups of tones to reduce signaling overhead* (column 36, line 33-38, The C/I of the users are determined and users are classified into groups based on their tolerance for up to q concurrent transmissions. The transmission pattern is then selected and data transmissions are scheduled to ensure conformance with the requirements of the Users).

Regarding **Claim 25**, Walton discloses *the number of tones pre-assigned to remaining users increases with each re-transmission attempt* (column 31, line 49-56, *In one channel upgrade scheme, users are successively reassigned to better available channels* (starting from the highest priority user), if these channels meet the requirements of the users and can provide larger link margins. Successively lower priority users (i.e., from highest to lowest) can then be assigned to any remaining

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channels).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 5** is rejected under 35 U.S.C 103(a) as being unpatentable over Walton et al (US 20050111462 A1, May 26, 2005) in view of Geile et al (US 6608835 B2, Aug, 19, 2003) (Hereinafter Geile et al).

Regarding **Claim 5**, Walton discloses all aspects of the claimed invention, except *for each remaining user, selecting ones of the tones further comprises minimizing a number of tones pre-assigned as select tones while ensuring a target data rate is achieved in light of the channel conditions associated with each of the select tones.*

Geile in the same field of invention teaches a transport system that disables the use of carriers (*tones*) which have interference and poor performance (*channel condition*) and only uses carriers (*minimizing number of tones*) which meet transmission quality targets (*target data rate is achieved*).

Walton and Geile are analogous art because they are from the same field of endeavor of access to a service device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teaching of Walton to include the teaching of Geile because it is providing flexibility in bandwidth for transmission of data in the telecommunications system, which is using the same frequency for optical transmission of the video signal as the frequency of the video signals when received is to provide high bandwidth transmission with reduced conversion expense.

8. Claims 13 is rejected under 35 U.S.C 103(a) as being unpatentable over Walton et al (US 20050111462 A1, May 26, 2005) in view of Geile et al (US 6608835 B2, Aug, 19, 2003) (Hereinafter Geile et al).

Regarding **Claim 13**, discloses all aspects of the claimed invention, except *the multi-carrier communication environment is an orthogonal frequency division multiplexing (OFDM) communication environment and the tones are OFDM tones.*

Geile in the same field of invention teaches this multi-carrier (*tones*) technique is based on orthogonal frequency division multiplexing (OFDM) where a bandwidth of the system is divided up into multiple carriers (*multi-carrier communication environment tones are OFDM tones*), each of which may represent an information channel).

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invention to modify the teaching of Walton to include the teaching of Geile because it is providing flexibility in bandwidth for transmission of data in the telecommunications system, which is using the same frequency for optical transmission of the video signal as the frequency of the video signals when received is to provide high bandwidth transmission with reduced conversion expense.

9. **Claims 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al (US 20050111462 A1, May 26, 2005) in view of Geile et al (US 6608835 B2, Aug, 19, 2003) (Hereinafter Geile et al).

Regarding **Claim 18**, Walton discloses all aspects of the claimed invention, *except for each remaining user, to select ones of the tones; the control system is further adapted to minimize a number of tones pre-assigned as select tones while ensuring a target data rate is achieved in light of the channel conditions associated with each of the select tones.*

Geile in the same field of invention teaches transport system(*control system*) can disable use of carriers(*tones*) which have interference and poor performance(*channel condition*) and only uses carriers(*minimizing number of tones*) which meet transmission quality targets(*target data rate is achieved*).

Walton and Geile are analogous art because they are from the same field of endeavor of access to a service device.

It would have been obvious to one of ordinary skill in the art at the time of the

invention to modify the teaching of Walton to include the teaching of Geile because it is providing flexibility in bandwidth for transmission of data in the telecommunications system, which is using the same frequency for optical transmission of the video signal as the frequency of the video signals when received is to provide high bandwidth transmission with reduced conversion expense.

10. **Claims 26** is rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al (US 20050111462 A1, May 26, 2005) in view of Geile et al (US 6608835 B2, Aug, 19, 2003) (Hereinafter Geile et al).

Regarding **Claim 26**, Walton discloses all aspects of the claimed invention, except *the multi-carrier communication environment is an orthogonal frequency division multiplexing (OFDM) communication environment, and the tones are OFDM tones.*

Geile in the same field of invention teaches this multi-carrier (*tones*) technique is based on orthogonal frequency division multiplexing (OFDM) where a bandwidth of the system is divided up into multiple carriers (*multi-carrier communication environment tones are OFDM tones*), each of which may represent an information channel.

Walton and Geile are analogous art because they are from the same field of endeavor of access to a service device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teaching of Walton to include the teaching of Geile because it is providing flexibility in bandwidth for transmission of data in the telecommunications

system, which is using the same frequency for optical transmission of the video signal as the frequency of the video signals when received is to provide high bandwidth transmission with reduced conversion expense.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure are:

- Laroia et al. (US 7047009 B2, May 16, 2006) teaches BASE STATION BASED METHODS AND APPARATUS FOR SUPPORTING BREAK BEFORE MAKE HANDOFFS IN A MULTI-CARRIER SYSTEM
- Any inquiry concerning this communication or earlier communications from the examiner should be directed to IQBAL ZAIDI whose telephone number is (571)270-3943. The examiner can normally be reached on 7:30a.m to 5:00p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NGO RICKY can be reached on 571-272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Ricky Ngo/
Supervisory Patent Examiner, Art Unit 2416

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